TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE   RENO, NEVADA   SOIL CONSERVATION SERVICE

JUNE 1993

AGRONOMY TECHNICAL NOTE NO. NV-67

SUBJECT: CPA - SOIL NITRATE LEACHING UNDER IRRIGATION

The attached Idaho Technical Note Agronomy No. 46 provides useful information from up-to-date research.

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Technical Notes

USDA-Soil Conservation Service
Boise, Idaho

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Soil Nitrate Leaching Under Irrigation

Dr. Jeff C. Stark, University of Idaho Agronomist stationed at Aberdeen, Idaho, has been making irrigation-nitrate leaching studies. He has provided the enclosed charts that show the relationships between irrigation, nitrogen applications and leaching of nitrate.

Table 1 shows the location and concentration of nitrate with various irrigation rates. Nitrate leaching increases significantly when irrigation exceeds crop use by more than 20 percent.

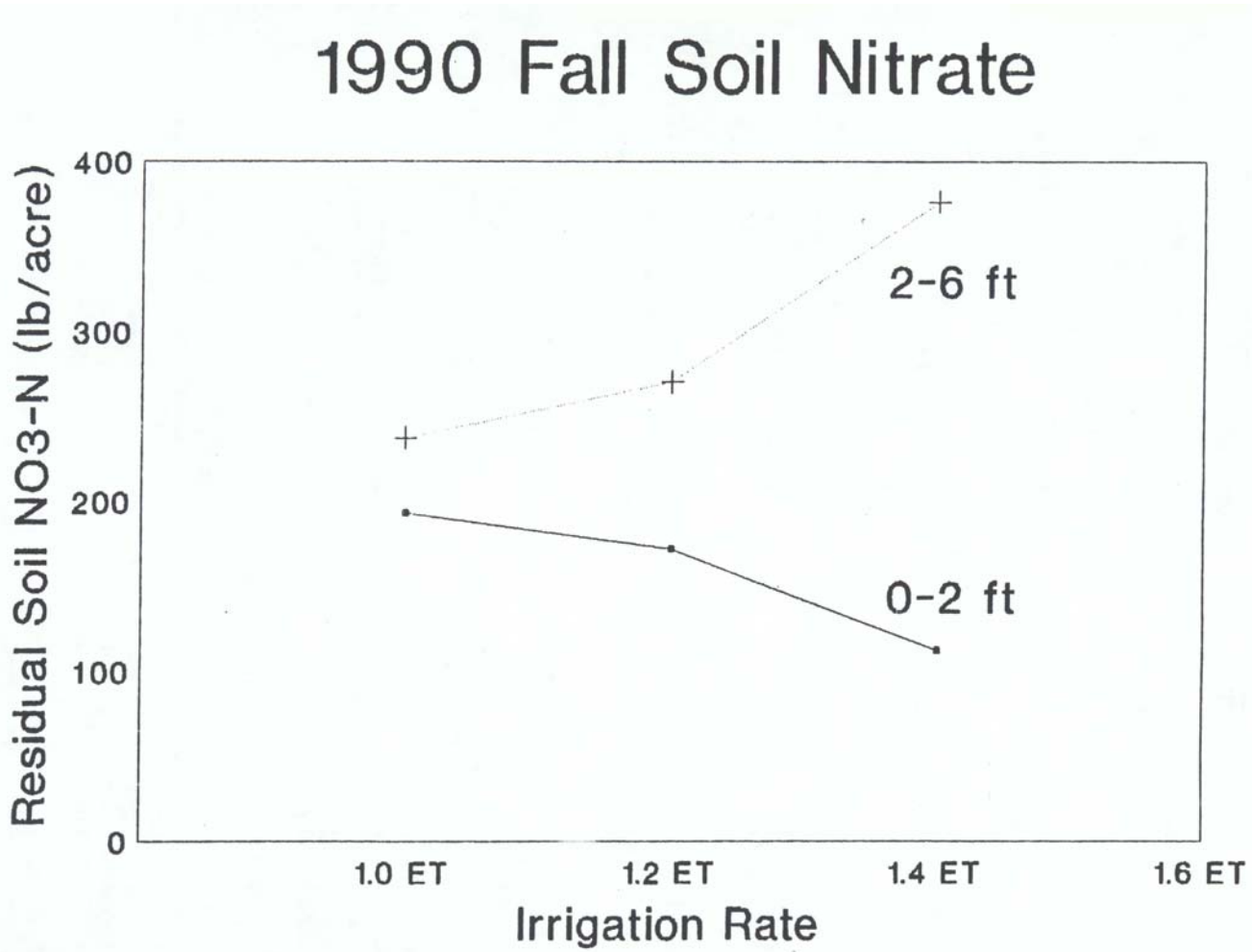
Table 2 shows the zone of nitrate accumulation in the soil profile with different irrigation rates. High irrigation rates rapidly move nitrogen down below the 2 foot depth. Irrigating to meet plant moisture requirements maintains higher levels of nitrate in the upper 2 feet of soil.

Table 3 shows the amount of nitrate leached from the 0-4 foot depth with an 1.4 foot irrigation and varying amounts of applied nitrogen. This table shows once the plant requirement (240 pounds/acre) is exceeded, nitrogen leaching increases significantly.

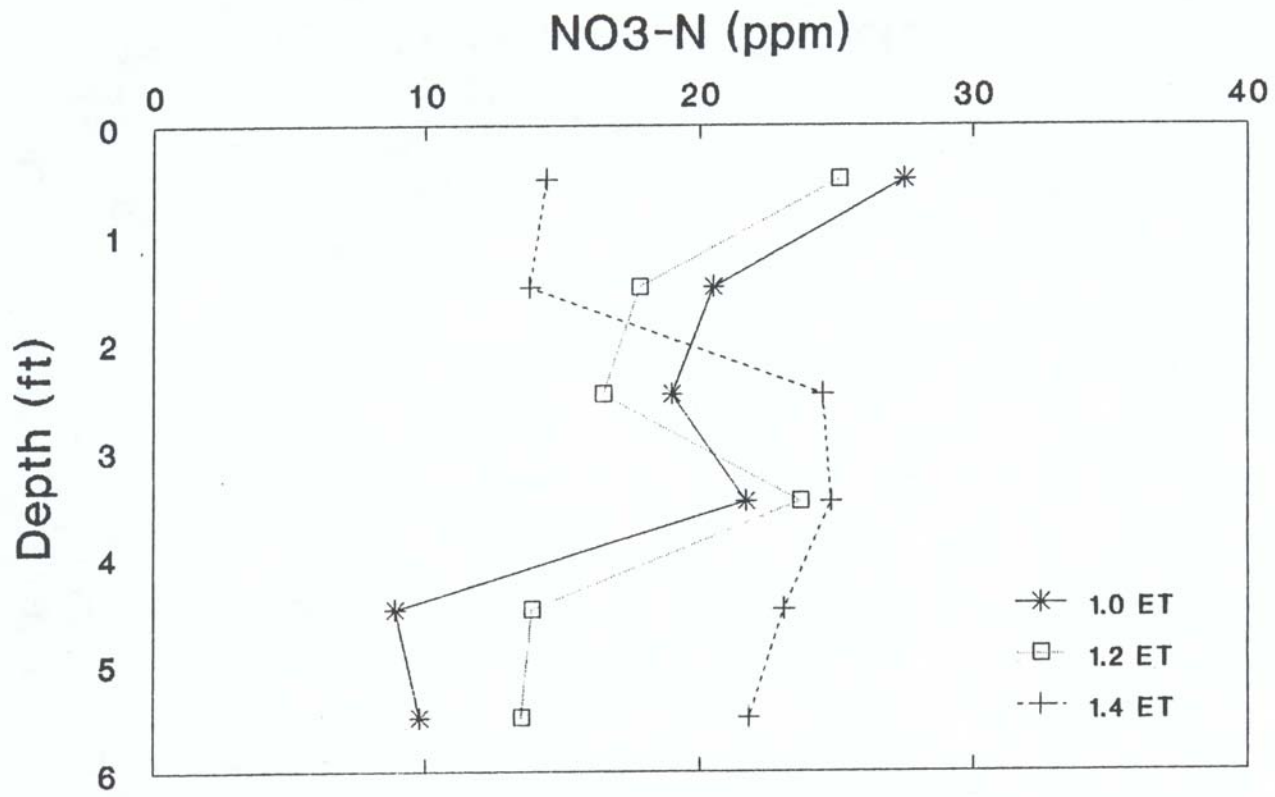
Conclusions

This data can be a valuable tool when planning water quality programs on irrigated cropland. It shows the relationships between plant use of nitrogen, water and deep leaching. Leaching increases when irrigation water exceeds crop use requirements by about 20 percent. Leaching also increases when nitrogen fertilization exceeds plant needs.

Quality management will account for both nitrogen and irrigation water on irrigated croplands.


1990 Fall Soil Nitrate
Residual Soil NO3-N (lb/acre)
400
300
200
100
0
2-6 ft
0-2 ft
1.0 ET
1.2 ET
1.4 ET
1.6 ET
Irrigation Rate

1990 Fall Soil N03-N Profiles



Nitrate-N Leached From The 0-4 ft Depth